

## LINGUAL GOITRE.

(ACCESSORY THYROIDS AT THE BASE OF THE TONGUE.)

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*Definition.*—The term goitre is a corruption of the Latin “guttur,” meaning throat, and was formerly used to denote any swelling of whatever nature existing in the front of the neck. For a long time, however, the use of the word has been restricted to a swelling of one part, the thyroid gland. Lingual goitre is a tumor, consisting of normal or pathological thyroid tissue arising from one of the accessory thyroid glands which may be formed at the base of the tongue in the course of the development of the thyroglossal duct.

*Embryology.*—About the third week of embryonic life there appear near the end and on either side of the cephalic extremity of the embryo four protuberances or ridges extending obliquely downward and forward towards the ventral surface. These ridges are known as the branchial arches, and the intervening furrows the branchial clefts. These arches do not develop with the same rapidity, and if we examine an embryo at the end of the third week we find that while the first pair have grown so close that their ends have almost fused together, between the second, third, and fourth pairs there is a triangular space called by His the “mesobranchial space.” At the top of this triangle between the first and second pair of arches a single tubercle is developed which His calls “tuberculum impar.” This tubercle forms the front and main portion of the tongue, while the posterior part is made by the fused ends of the second and third pairs of branchial arches. (Plates I and II.) These three segments then grow gradually together, the two lateral halves of the posterior segment fusing together in the form of a V. Immediately behind

the tuberculum impar there appears a slight evagination of epithelium, which as it grows forms a pouch. The three segments of the tongue fusing together completely enclose this pouch, and we thus have a canal lined with epithelium leading downward from the apex of the V. This canal is named by His the "thyroglossal duct." This descends and eventually forms the isthmus of the thyroid body, the lateral lobes of this gland being derived "from the epithelium of the fourth gill clefts." About the fifth week the duct begins to atrophy, forming a fibrous cord, which passes from the dorsum of the tongue between the two geniohyoid muscles under the mylohyoid terminating in the isthmus of the thyroid body, and, in the course of time, this cord disappears, and we have nothing to show that the thyroglossal duct ever existed except a slight depression on the dorsum of the tongue, which is known as the "foramen cæcum." \*

Sometimes, however, this entire obliteration does not occur, and we find in adults the whole or parts of the duct remaining. There may be a vestige left as a short tube leading from the isthmus of the thyroid upward or from the foramen cæcum downward to the hyoid bone. Bochdaleck, in a series of fifty subjects, has found in thirteen a canal anywhere from ten to fifteen millimetres in length, while His, Marshal, and others have also reported cases of the persistence of the duct.

It often happens that during the descent of the thyroglossal duct from the tuberculum impar small diverticula are formed, jutting out from the sides of the canal, and these may persist after the atrophy of the duct itself. The epithelium of these diverticula, which is the same as that lining the walls of the duct, or, in other words, is the embryonic tissue of the thy-

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\* I have followed the views of His as regards the embryological development of the thyroglossal duct and tongue. Late researches tend to show that the "tuberculum impar" does not alone form the forepart of the tongue, but that the greater portion is formed by outgrowths from the first pair of branchial arches. This would mean that the tongue is developed from four segments rather than three. See *Verhandlungen der Anatomischer Gesellschaft*, 1901, Vol. xv, pages 41, 42.

roid body, proliferates, and there are formed several masses of glandular tissue similar in structure to the thyroid body and known as accessory thyroid glands. It will readily be seen that these glands may be found anywhere between the foramen cæcum and the thyroid body, and, in fact, they are often found elsewhere in the body, Osler stating that there is a case on record of one occupying the whole right pleura (Osler, "Practice of Medicine," p. 836). For the sake of convenience, we may divide these glands into two classes,—those occurring above the hyoid bone and those below, and it is with the first of these classes that this paper deals.

Verneuil, in 1853, was the first to call attention to this subject. He says that, "while dissecting the insertions of the muscles of the tongue on the hyoid bone, a small glandular mass was exposed which was quite strongly adherent to the middle part of the superior border of this bone between the geniohyoid and genioglossus muscles. This mass was red, soft, and sessile, the size of a large pea, with a smooth, shining surface, and composed of a homogeneous tissue, which upon microscopic examination proved to be that of the thyroid gland." Since then much has been written concerning these glands by such investigators as Zuckerkandl, Kaydi, Grüber, Madelung, and others.

Their general characteristics when not in a pathological state may briefly be described as follows: their size may vary from that of a hemp-seed to a pea, while their contour is either round or ovoid, with a smooth or granular surface. They may be encapsulated and free in the deep muscles of the tongue; but, as a rule, they are attached to the hyoid bone by a kind of fibrous ligament which is supposed to be the remnant of the thyroglossal duct. Histologically, they resemble the thyroid body, and their function is probably the same as that gland, for, as I shall show later, extirpation of these glands has in some instances been followed by myxœdema. Their blood-supply is derived from branches of the lingual arteries.

Such, then, is the history in brief of the development of

accessory thyroid glands. As a rule, they cause no inconvenience and give rise to no symptoms, and a man may go through life unaware that there is anything abnormal about him. It is only when a pathological process is set up in one of these glands (I am speaking only of those at the base of the tongue) that the patient is aware of anything wrong and applies to a physician for relief, and it is then found that he is suffering from an affliction called by the French "Le goitre lingual."

That the disease is rather a rare one is shown by the fact that twenty-nine of the following cases are all, to the best of my knowledge, that have ever been reported. Through the kindness of Dr. S. J. Mixter and Dr. L. R. G. Crandon, I am able to report their two cases for the first time; while one other, that of Goris, is mentioned by Gaudier and Chevallier (*Lo Presse Oto-Loryngologique Belge*, January, 1903), making a total of thirty-two. It will be seen that the greater part of these have been published within the last fifteen years; and it is very probable that, while the disease may often have occurred, it is only of late years that the true nature of the growth has been recognized, and even then, in most cases, only after operation.

CASE I.—*Congenital Tumor of the Base of the Tongue pressing down the Epiglottis on the Larynx and causing Death by Suffocation Sixteen Hours after Birth.* Hickman (*Transactions of London Pathological Society*, 1869, Vol. xx, p. 160).

On July 24, 1868, Mrs. C. was delivered of a girl after a normal labor at full term. The child at first appeared lifeless, making no attempt to cry or inspire, but, after being slapped and placed in a warm bath, respiration was got up, and continued all night in a feeble manner, interrupted by short gasps or sighs. No voice nor cry could be obtained. The next morning the breathing became so difficult that a doctor was sent for in haste. Putting his finger in the child's mouth, he found a large tumor projecting from the base of the tongue. It was impossible to see or feel the deep connections of the tumor, and no question of ligature or ex-

cision could then be entertained, and the child died in spite of all efforts at artificial respiration.

Autopsy showed that at the base of the tongue was a prominent, rounded, well-defined tumor about three-quarters of an inch from before backward, half an inch across and elevated nearly half an inch above the surface of the tongue. It was hard to the touch, and its surface was covered with the normal mucous membrane of the tongue. Its lower part was in contact with the epiglottis, pressing it over the rima glottis. Microscopic examination showed the tumor to consist of glandular follicles and be very rich in blood-vessels.

CASE II.—Case of Lucke, published by Merten (*Archiv für Anatomie und Physiologie*, 1879, p. 483).

Man, twenty-two years old; had had from childbirth a tumor near the hyoid bone. For the past year it had grown considerably and caused him much annoyance. The tumor was as large as a man's fist, was situated in the median line beneath the chin and could easily be felt in the mouth, while its base was in the root of the tongue. It was supposed to be a dermoid cyst, was removed through a vertical incision from the chin to the hyoid bone. There was no adherence to this bone. The patient had entirely recovered at the end of six weeks. Histological examination showed that the tumor was composed of thyroid tissue filled with colloid material.

CASE III.—*Tubular Adenoma of Root and Dorsum of Tongue*. Parker (*Transactions of London Pathological Society*, 1881, Vol. xxxii, p. 238).

Girl, sixteen and one-half years old: had a growth the size of a walnut projecting from root of tongue. It was hemispherical in shape, firm and slightly elastic, covered with stretched and ingested mucous membrane. Excised in June, 1877, a portion being left, which by December, 1878, had increased to half the size of the original tumor. By April, 1881, it had dwindled to half that again, the patient being well and not inconvenienced by it. Microscopical examination showed it to consist of glandular tubes lined with cubical epithelium, some containing plugs of gelatinous-looking material.

CASE IV.—*The Origin of the Foramen Cæcum Linguae as shown by an Operation on a Rare Tumor of the Root of the*

*Tongue.* Bernays (*St. Louis Medical and Surgicol Journal*, October, 1888, Vol. iv, p. 201).

Girl, aged seventeen; complained of having great difficulty in swallowing, and that her articulation was greatly impaired by a growth under her chin, which extended into her mouth and could be seen and felt on the back part of the root of her tongue. The tumor consisted of two parts (Plate III), one as large as a bantam's egg, the other the size of a cherry. On the surface of the small tumor was a depression in the shape of a canal, about one-fourth of an inch deep, which corresponded to the foramen cæcum. The upper lobe of the tumor projected into the pharyngeal cavity and was covered by mucous membrane, only the other half lay between the muscles of the tongue, bulging out at the submental surface.

Operation consisted of a median incision from the inferior maxilla to the hyoid bone, through which the tumors were easily enucleated. They had a thin, well-developed connective-tissue capsule. Complete recovery in fourteen days. Microscopical structure proved it to be nearly normal thyroid gland tissue.

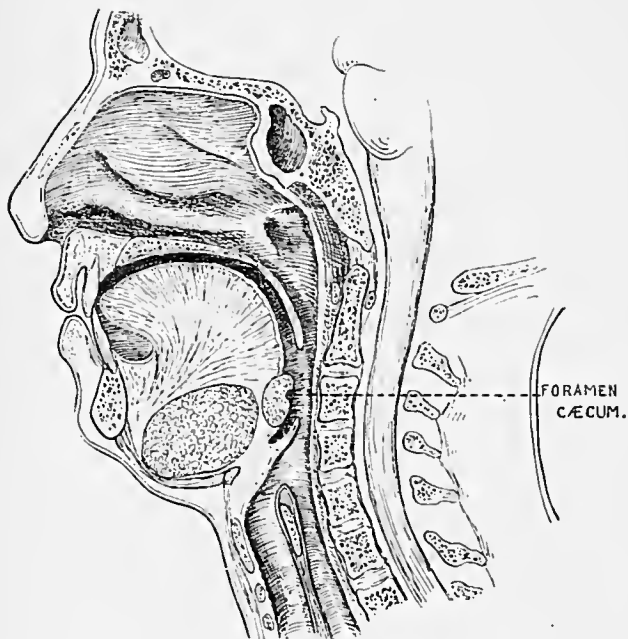
CASE V.—*Accessory Thyroid at the Base of the Tongue.* Wolf (*Archiv für klinische Chirurgie*, 1889, Vol. xxxix, p. 224).

Girl of eighteen; had complained since her twelfth year of a swelling in her throat immediately following an attack of whooping-cough, and she now had difficulty in swallowing. Simple inspection of the mouth showed nothing, but examination by the laryngoscope revealed on the left side of the base of the tongue a firm tumor about the size of a nut. Treatment with iodide at first relieved her symptoms, but the growth then suddenly began to increase in size, and one year after the patient was first seen she returned to the hospital. Tracheotomy was performed; an incision was made in the median line beneath the chin, the inferior maxilla divided, the lingual arteries tied, the tongue split, and the tumor enucleated. The tissue of the tumor proved to be that of the thyroid gland.

CASES VI, VII.—*Two Cases of Glandular Tumor of the Tongue.* Butlin (*Clinical Society's Transactions*, Vol. xxiii, p. 118, and *British Medical Journal*, December 1, 1894).

Female, aged thirty-two; had a tumor at base of tongue, which could easily be seen when the tongue was pulled out. Had noticed it for one year; was about the size of a hen's egg, round,

PLATE III.



Bernays' Case, No. IV.

smooth, covered with mucous membrane, and so elastic that, with the idea of its being a cyst, it was punctured with the result that there was a free hæmorrhage for several minutes. Patient could speak clearly and swallow without much difficulty, but had been greatly afflicted with "sore throat." Operation March 6, 1889. Tracheotomy was performed and Hahn's tube inserted. The tongue was pulled out and the tumor removed. It did not appear to be very deeply embedded in the tissue of the tongue. It appears that all of the tissue of the tumor was not removed, and by the following June it had grown to be as large as a small bantam's egg. There was no return of the symptoms, and later the growth subsided.

Female, twenty-two; for four years had occasionally vomited blood. Two years previously had noticed a swelling at base of tongue, which her doctor had lanced with much bleeding. For nine months she had had great difficulty in speaking and swallowing. Examination showed that the tumor was identical with that described in the previous case, except that it was slightly smaller. Tumor was partly removed by means of a large galvanocautery loop. There was a slight return of the growth, but not enough to give rise to any inconvenience.

Sections of both tumors showed them to be "cystic tubular adenomata" of thyroid origin.

CASE VIII.—Staelin (*Jahrbücher de Hamburgischer Staats-Krankenhaus*, 1891-92, p. 413) reports an autopsy on a woman of seventy-seven years where a tumor as large as a walnut was found in the middle of the base of the tongue. It was of hard consistency, covered with normal mucous membrane, and buried in the muscles of the tongue. The tumor proved to consist of normal thyroid tissue.

CASE IX.—*Case of Enlarged Accessory Thyroid Gland at the Base of the Tongue*. J. Collins Warren (*American Journal of the Medical Sciences*, 1892, Vol. civ, p. 377).

Female, fifty-two years of age; had first noticed lump in throat in 1870, when she was suffering from "bronchial" trouble. Since then it has slowly been growing in size. During an attack of gripe in 1892 "the tumor became swollen and inflamed, and after that the lump seemed to settle back in the windpipe, and has since caused considerable irritation, obliging her to hawk and spit constantly."



Examination showed a tumor about the size of a hen's egg, situated upon the base of the tongue, covered with normal mucous membrane, upon which ran a tortuous vessel of considerable size.

*Operation.*—The tongue was drawn forward by means of one ligature passed through its tip and two passed through the dorsum of the tongue on either side of the growth. The tumor was then easily enucleated through a median incision. The redundant mucous membrane was excised on either side and the edges of the wound brought together with catgut sutures. Three vessels required ligature, one of them being of considerable size. Patient made an uninterrupted recovery, and there was no return of the tumor. Dr. W. F. Whitney reported the structure to be that of the thyroid gland.

Dr. Warren also states that he has twice before seen tumors at the dorsum of the tongue which were probably of the same nature. One was removed at the Massachusetts General Hospital in the early seventies, and "consisted of tissue closely resembling that of the thyroid gland." The other occurred in a young girl of twenty-one, and was "about the size of the last phalanx of the ring-finger." It gave but little trouble. There was no operation, and the patient was lost sight of.

*CASE X.—Accessory Thyroid at the Base of the Tongue.* Galish (*Deutsche Zeitschrift für Chirurgie*, 1894, Vol. xxxix, p. 560).

Female, twenty-four years of age; had a tumor the size of a walnut between the hyoid bone and inferior maxilla situated in the median line. She had first noticed it four months previously, when it appeared like a small nodule. This tumor was excised and found to be an accessory thyroid. One year later, after a noon meal, the patient had the sensation of a foreign body in her throat, and rejected in a fit of coughing about a half a pint of dark blood. Repeated hæmorrhages followed, but without effort, cough, or vomiting, the patient losing about a quart and a half of blood. A diagnosis of hæmatopsis was made and patient sent to hospital, where she had repeated hæmorrhages for several days, but without cough. She had no trouble in breathing, but her voice was considerably changed. Simple examination of the mouth showed nothing, but by means of a laryngoscope a tumor was seen attached to the base of the tongue, round, the size of a cherry, covered with a deeply injected mucous membrane. It was so

elastic that, deeming it to be a cyst, a puncture was made, which only resulted in a hæmorrhage.

*Operation.*—Tracheotomy and a T-shaped incision, the horizontal part of which was between the two rami of the lower jaw and the vertical in a median line, dividing in halves the hyoid bone. The tumor was enucleated, accompanied by much hæmorrhage. The patient had a rapid recovery, and there was no return. Thyroid gland was not enlarged. Tumor consisted of thyroid tissue very rich in blood-vessels.

CASE XI.—Baber, October 10, 1894, reported to the Society of Laryngology at London a case of a young girl of sixteen who had been troubled for nine months with a swelling at the base of the tongue. It was removed with a galvanocautery loop, but soon reappeared. It proved to be of thyroid tissue without cysts.

CASE XII.—*Case of Accessary Thyroid Gland projecting into the Mouth.* Bond reported by McIlraith (*British Medical Journal*, December 1, 1894).

Girl, seventeen years old; complained of a lump at the back of the tongue. Had noticed it for two months. It gave no trouble, except that her voice was a trifle thick. Examination showed a tumor the size of a walnut situated close to the foramen cæcum. It was semielastic and immovable on the deep tissues of the tongue. The thyroid was normal.

*Operation.*—Mucous membrane round about tumor was cut with a pair of curved scissors. It was then fixed with a pair of tenaculum forceps and removed with the aid of a raspatory and a Mackenzie's polypus snare. There was profuse bleeding, which was controlled by pressure at the base with a finger, round which a piece of lint steeped in turpentine was wrapped. Wound healed in ten days. The structure of the tumor was that of the thyroid gland.

CASE XIII.—*Accessary Thyroid at the Base of the Tongue.* Lymphius (*Deutsche Zeitschrift für Chirurgie*, 1897, Vol. xlv, p. 451).

Female, aged thirty-four; had had for two years a swelling at the base of the tongue, which had steadily increased in size and gave difficulty in speaking and swallowing. For some years she had had a sensation of suffocation and hoarseness. In April, 1894, there was a hæmorrhage followed by an increase in the size of the tumor. In June it was lanced by a doctor, profuse bleeding

followed. When she entered the hospital the patient spoke as if she had a "billiard-ball" in her mouth and swallowed frequently. A tumor as large as a walnut was seen at the base of the tongue, firm to the touch, covered with blood-vessels, and pressing down upon the epiglottis.

*Operation.*—Tracheotomy was performed and the mouth kept open with a gag, the palatoglossal muscles incised, the tongue drawn forward, and tumor enucleated, accompanied by a severe hæmorrhage. There was complete recovery and no return of the growth. Tumor consisted of very vascular thyroid tissue.

CASE XIV.—*Accessory Thyroid at Base of Tongue. Myxædema after Removal.* Seldowitsch (*Centralblatt von Chirurgie*, 1897, p. 499).

Girl, fourteen years old; had swelling at base of tongue near the foramen cæcum; was round, smooth, firm, the size of a cherry, projecting on the dorsum of the tongue and causing considerable annoyance. Patient was unaware how long it had been there. Tumor was removed with a galvanocautery loop and proved to be of thyroid structure.

Patient returned to the hospital in six months with all the symptoms of myxædema. The thyroid could not be felt.

CASE XV.—*Goitre at the Base of the Tongue, Myxædema following Operation.* Kraske reported by Von Charnisso (*Beiträge zur klinischen Chirurgie*, 1897, Vol. xix, p. 281.)

Woman, thirty-seven years old; afflicted with cretinism and complete absence of thyroid body; complained of trouble in speech, deglutition and respiration. On the base of the tongue, slightly to the right of the median line, was a swelling as large as a walnut, with a smooth surface covered with large vessels. To the touch part was firm and part fluctuating.

*Operation.*—Tracheotomy, traction forward on the tongue and enucleation. Structure was in part that of embryonic thyroid tissue and partly that of ordinary goitre with colloid degeneration. Patient returned in four months with symptoms of myxædema, and was treated with thyroid extract.

CASE XVI.—Reintjes, of Nymegen, on May 23, 1898, reported a case of lingual goitre to the Society of Laryngologie, Rhinologie, and Otologie of Holland. It occurred in the case of a man twenty-five years old, who was troubled with severe hæmorrhages. These were without apparent cause and were not accom-

panied by vomiting or coughing, but sometimes followed the swallowing of a large mouthful of food. At the base of the tongue could be seen a swelling. It was of dark brown color, smooth and elastic to the touch, and covered with large veins.

*Operation.*—Tracheotomy, traction forward on the tongue, the anterior pillar of the fauces divided, capsule of tumor split horizontally, and tumor shelled out. Tumor consisted of thyroid substance.

CASE XVII.—Treitel, before the Berlin Medical Society, May 25, 1898, reported a case of presumable lingual goitre which had existed for twenty years in a woman. The symptoms were slight, only occasional trouble in swallowing. There was no operation.

CASE XVIII.—Benjamins (*Nederl Tijdsch voor genesk*, 1899) reports a case of goitre at the base of the tongue occurring in a man. There was absence of the true thyroid. Operation was followed by symptoms of myxædema.

CASE XIX.—Posthumus Meyjes read before the Society of Otologic and Laryngologie of Belgium, June 4, 1899, a case of a woman of twenty-four years who since childhood had had the sensation "as if there were a potato stuck in her throat." From time to time she spat up bloody pieces of mucus. Examination showed a tumor occupying the right half of the base of the tongue, protruding 2.5 centimetres, round, smooth, not painful, immovable, and covered with dilated vessels. No true thyroid could be felt. There was no operation.

CASES XX, XXI.—*Two Cases of Accessory Thyroid Tumors at the Base of the Tongue.* Schadle (*Journal of American Medical Association*, August 12, 1899, Vol. xxxiii, p. 386).

Woman, twenty-five years of age; had noticed for the past six months a growth at the base of her tongue. The condition caused her more mental annoyance than physical discomfort. Menstrual function had been rather irregular of late. Respiration and deglutition were not interfered with, but impairment of speech was noticeable, the voice being thick and not resonant. Examination showed the growth to be the size of an English walnut, covered with mucous membrane, which showed an intense superficial vascularity, of a deep purplish red color, hard, and immovable. Exploratory puncture was followed by copious bleeding. For two months electrolysis was employed, with the

result that the tumor was reduced to one-third of its original size. During the time of the apparently suppressed menstrual function, the lingual tumor would swell and become very vascular, —a very peculiar phenomenon. Several violent hæmorrhages then occurred, and an operation was advised and performed by Dr. McBurney. The tumor was enucleated through an incision extending from the symphysis menti to the hyoid bone. There was considerable hæmorrhage and no return of the tumor.

Its structure was that of the thyroid gland.

The second case was that of a woman, twenty-three years old, who had noticed a growth upon the base of her tongue for ten years. Her voice had entirely lost its resonance, she had some difficulty in swallowing, and a shallow, resistant cough. Inspection showed a tumor situated at the base of the tongue anterior to the epiglottis. It was smooth, dense, of a dusky red color, with a characteristic resilient feel, and appeared perfectly homogeneous. Operation was refused, but the characteristics of this tumor were so typical that we can safely call this an accessory thyroid.

CASE XXII.—Dr. Holmes (same reference) reported a case in every respect similar to that of Dr. Schadle. In this case the tumor was partly removed by the galvanocautery.

CASES XXIII, XXIV.—*Two Cases of Accessory Thyroid Glands at the Base of the Tongue.* Watson (*New York Medical Journal*, Vol. lxx, p. 579, October 21, 1899).

Woman, fifty years of age; complained of great dyspnoea and difficulty in swallowing. She stated that there had been a lump in her throat for the past ten years, which had given little trouble until recently, when it had begun to enlarge. Examination showed a smooth tumor at the base of the tongue pressing back upon the epiglottis. It was about an inch and a half long, one inch wide, and an inch thick; it was smooth and firm, with an ulcerated top, the ulcer being covered by a white slough or membrane. Part of the tumor was removed with the galvanocautery loop. Structure was that of a degenerated thyroid body.

The second case was that of a colored girl sixteen years old. There had been a "lump in her throat" for five years, which had lately interfered with her swallowing. Examination showed a growth in every way similar to that of the previous case, except that it was not ulcerated. Tumor was removed with the galvanocautery snare. Structure was that of the thyroid gland.

CASE XXV.—*Thyroid Tumor at the Base of the Tongue.* Vallas (*Revue de Chirurgie*, May 10, 1900).

Young girl of twenty years; complained of difficulty in swallowing; the tone of her voice was altered and resembled the voice of patients with ranula. Examination showed a tumor the size of a small nut situated behind the foramen cæcum on the dorsum of the tongue, elastic, and not painful upon pressure. Diagnosis of cyst of the thyroglossal canal was made.

*Operation.*—Incision was made above the hyoid bone to the right of median line, and a puncture made into the mouth through the tumor. Drainage was established, and the wound healed well; the patient left the hospital much improved. Six months later she returned, saying that as soon as the drainage gauze had been removed the tumor had begun to grow. This time a median incision was made, the hyoid bone divided, the fibres of the mylohyoid separated, and whole tumor easily enucleated. There was no return. Histological examination showed structure of the thyroid gland.

CASE XXVI.—*Case of Accessory Thyroid Tumor at the Base of the Tongue.* Theisen (*Albany Medical Annals*, 1901, Vol. xxii, p. 537).

Tumor occurred in a woman sixty-seven years old, and was identical in every way with those of Dr. Warren and Dr. Schadle. Owing to the age and condition of the patient, operation was not advised. In this case the patient, when quite young, had a well-marked goitre, now the thyroid cannot be felt. The tumor also appears larger at times than others.

CASE XXVII.—*A Case of Lingual Goitre.* Curtis and Gaudier (*Revue Hebdomadaire de Laryngologie, Otologie, et de Rhinologie*, Vol. xxiii, p. 417, April 12, 1902).

Young woman of twenty-one years; complained of difficulty in swallowing and talking. Her voice had a nasal quality, not very sonorous, often hoarse or muffled. She had had a growth on her tongue for five years. This had been partially cut and cauterized two years previously, but lately had returned. Examination with a laryngoscope showed behind the lingual V a round tumor, the size of a large nut, covered with normal mucous membrane and a fine net-work of vessels. It was of elastic, almost soft, consistency, and seemed firmly embedded in the muscles of the tongue. The thyroid body was small and the lymph glands normal.

Diagnosis of lipoma or liposarcoma.

*Operation.*—The mouth was kept open by a gag, a silk suture passed through the tongue, which was then drawn forward as far as possible. Another strong silk suture was then passed under the mass of the tumor and well within the normal tissue of the tongue. This suture not only assisted in drawing out the tongue, but after operation acted as a hæmostat, and allowed the edges of the wound to be quickly approximated. The tumor was then enucleated through a median incision of its mucous membrane covering. There was profuse bleeding. Recovery was complete and there was no return of the growth. The structure of the tumor was that of a typical thyroid gland.

CASE XXVIII.—*Accessory Thyroid Tumor situated at the Base of the Tongue.* Winslow ("American Medicine," December 13, 1902).

Girl, aged seventeen; complained of having difficulty in swallowing. Had always been troubled with sore throat, and her voice was muffled and indistinct. Examination showed an ovoid mass about half the size of a hen's egg upon the base of the tongue between the foramen cæcum and the epiglottis. It was smooth, covered with mucous membrane, and somewhat elastic to the touch.

*Operation.*—The growth was thought to be too large to remove through the mouth, and was enucleated through a median incision from the chin to the hyoid bone. Wound healed by first intention. Structure of tumor was that of the thyroid gland.

CASE XXIX.—*Thyroid Tumor at the Base of the Tongue.* Gaudier and Chevallier (*La Presse Oto-Laryngologique Belge*, January, 1903).

This occurred in a girl twenty years old. It had existed for three years, and was in every way identical with the previous case reported (Case XXVII). This time, as the patient's tongue was very short and plump and the tumor very far back, it was decided to operate by incision through the hyoid bone, as described in Case XXV (Vallas). A median incision was made, the hyoid bone divided, and the tumor enucleated. As no normal thyroid body had been found, it was thought best to leave a small section of the gland in order to avoid the after appearance of myxœdema. Complete recovery. Section of tumor showed thyroid tissue.

CASE XXX.—The same authors cite a case of Goris which

has never been published, in which the removal of a lingual goitre was followed by myxœdema. In this case operation was through the mouth, and the tongue was cut from its anterior insertions in order that it might be drawn forward.

CASE XXXI.—*Accessory Thyroid at Base of Tongue.* S. J. Mixer (Massachusetts General Hospital, August 9, 1895).

Female, age twenty-four; had noticed a swelling on back of tongue for three weeks, which had not given any inconvenience in swallowing or talking. There was no pain. Examination showed a mass about the size of a small hickory nut on the dorsum of the tongue. Another, about the same size, can be felt under the symphysis of the jaw.

*Operation.*—Incision in the median line of neck two inches long and tumor shelled out. Growth was the size of a white grape and connected with the thyroid. Other tumor was removed through the mouth by an operation similar to Dr. Warren's case, No. IX. Tumor consisted of thyroid tissue. Recovery was complete.

CASE XXXII.—Dr. L. R. G. Crandon had as a patient a young girl, nine years of age, who had noticed a growth in her throat for one and a half years. She complained of having great difficulty in breathing while in bed. She was unable to assume a recumbent position and was obliged to sleep while sitting propped up with pillows. A year ago she consulted a throat specialist, and an attempt was made to remove the tumor. Such a profuse hæmorrhage occurred that the operation was stopped. Examination showed a growth about the size of a nut situated at the base of the tongue, ovoid in shape, covered with smooth membrane and elastic to the touch. (Plates VI, VII, VIII drawn from life.) The case has not yet come to operation.

*Etiology and Evolution.*—The most striking etiological fact regarding lingual goitre is its occurrence among women rather than men. Thus, out of thirty-two cases we have but three occurring in men, namely, those of Lucke, Reintjes, and Benjamins. In this respect the affection is similar to the more ordinary forms of goitre which are found much more frequently in women than in men. Why this is so has never been satisfactorily explained.



Grüber states that in a series of 300 subjects with superior accessory thyroid glands, 250 were men and fifty were women, and again, out of twenty-three other cases, eighteen were men and five women. These figures show that accessory thyroids occur overwhelmingly more frequently in men than in women, and yet we find that in women they develop into tumors and give rise to lingual goitre in the proportion of twenty-nine to three. Why is this? It is a question that cannot be answered at the present time, and a dense cloud of obscurity hangs over the etiology and pathogenesis of all forms of goitre.

Lingual goitre may occur in patients at any period of life. Thus, in the case of Hickman, we find it occurring in a newborn child, while in the autopsy reported by Staelin the subject was a woman of seventy-seven years.

It is, however, generally to be found in women between the ages of fifteen and forty. There is no reason to doubt but that the accessory thyroids at the base of the tongue may undergo the same morbid processes as the thyroid body itself in a case of ordinary goitre. In some cases we find that these lingual glands, in the absence of a normal thyroid body, have undergone a compensatory hypertrophy, and have taken up the function of the thyroid itself, so that after extirpation the symptoms of myxœdema have appeared (cases of Seldowitsch, Kraske, Benjamins, Meyjes, and Goris).

The evolution of lingual goitre is like its etiology, not well understood. In most of the cases, the presence of the growth had been perceived for a long time without any inconvenience arising from it. Then all at once the tumor begins to grow, and we have a chain of serious symptoms. What is the reason for this long latent period and sudden eventual quick development? In but two cases is there any specific cause stated. Dr. Warren's patient, who had noticed the growth for twenty years, said that during an attack of grippe the tumor became swollen and inflamed, and after that "the lump seemed to settle back in the windpipe," and then caused considerable irritation, obliging her to "hawk and spit con-

PLATE IV.

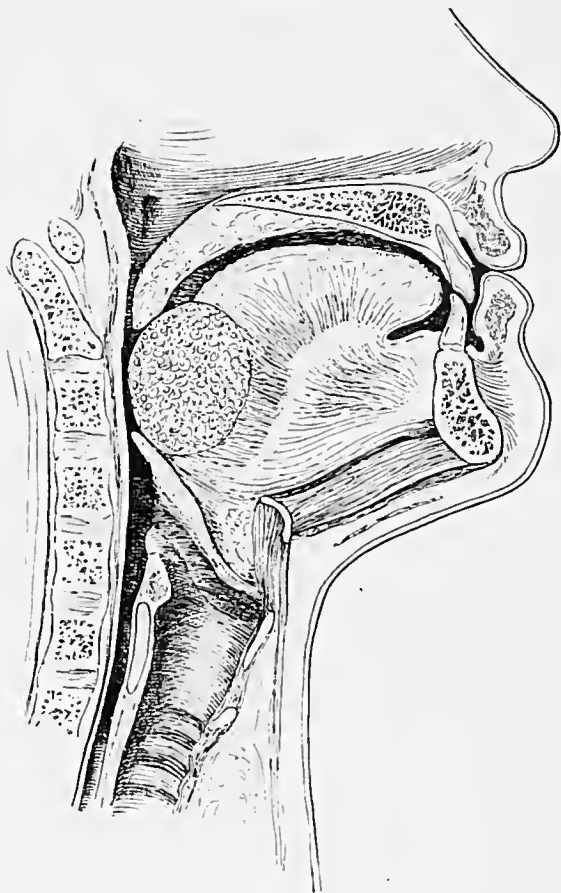
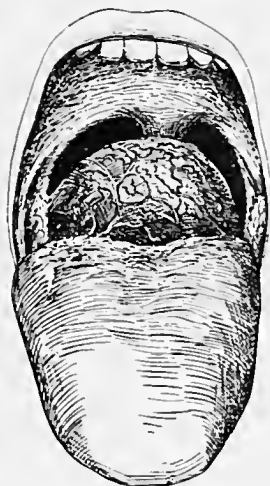


Diagram showing typical situation of tumor.

PLATE V.



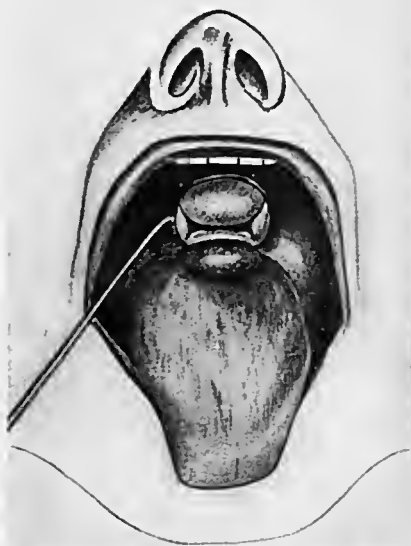
View through mouth with tongue drawn forward showing  
the vessels on surface of tumor.

PLATE VI.



Showing appearance of tumor in mouth.  
Unpublished case of Dr. Crandon, Case XXXII.

PLATE VII.



Laryngoscopic view

PLATE VIII.



Rear view, showing tongue, tumor, and epiglottis.  
VI and VII drawn from life; VIII, constructed.

tinually." In Wolf's case the patient first noticed the growth after an attack of whooping-cough, but in both of these cases we cannot call the grippe and whooping-cough the specific causes of the tumors, and in all probability it is a simple coincidence that the one followed on the heels of the other. It is very likely that puberty plays an important rôle in the development of these growths, as it appears to do in that of normal thyroids.

*Pathological Anatomy.*—These lingual tumors present in the main the same macroscopical appearances. They are situated upon the dorsum of the tongue, generally just behind and below the foramen cæum, but sometimes enclosing it in their growth (Bernays), on the median line, as a rule, but perhaps a little to the right or left. In shape they are round or ovoid, while their volume is quite variable, ranging from the size of a cherry or small nut to a man's fist. The tumor is encapsulated and may project markedly about the surface of the tongue, or be almost buried in the muscles of this organ. In either case there is no inflammation or infiltration of the surrounding tissues, and at operation the tumor has in most cases been easily enucleated. (Plate IV.) Its surface is covered with the mucous membrane of the tongue, and in only one case (Watson) has there been any ulceration. It is smooth and shining, and in color is darker than that of the surrounding mucous membrane, due to the great infiltration of blood-vessels which is always to be seen. These vessels not only cover the surface of the goitre, but penetrate deeply into its tissue and cause the profuse hæmorrhages which occur at operation. This rich vascularization is a striking and characteristic feature of lingual goitre, and is of great value in differential diagnosis.

The tumor may or may not be movable. This depends upon its age, size, and the depth to which it has penetrated the muscles of the tongue. Its consistency is very variable. We may find a firm, elastic mass or a soft and fluctuating one. This variability depends upon the structure of the tissue of the tumor. Thus, in Bernays's case the growth consisted of

almost normal thyroid tissue. In Warren's there was colloid degeneration; then, again, in that of Kraske the tubules were full of embryonic thyroid cells; and still again we find the formation of cysts containing yellowish transparent fluid. (Gaudier and Chevallier.)

*Symptoms.*—The presence of lingual goitre is marked by a variety of symptoms. The troubles caused by it are purely functional, and these vary with the size of the tumor. In but one case do we find any constitutional symptoms present; in all the others the patients appeared to be in the best of health. This single case is the first of those reported by Schädle in a woman of twenty-five. He states, "she was anæmic and the muscles soft and flabby. Evidences of malnutrition and nervous exhaustion were marked. She complained of insomnia and gastric derangement. A heavily coated tongue, loss of appetite, constipation, and distressing flatulency of the bowels were pronounced symptoms." There is, however, no reason to connect this set of symptoms with the growth on the back of the tongue, except in so far as to produce an excessive amount of mental worry.

The size and the situation of the tumor determine the severity of the symptoms. It may be as large as a walnut, and yet cause no inconvenience (Staelin), and again may be the size of a cherry, and yet be so situated that by projecting into the pharynx cause serious trouble. The symptoms are those such as would be produced mechanically by any foreign body, and with one exception are not at all pathognomonic, but are characteristic of all tumors of the tongue which mechanically obstruct the entrance to the œsophagus or trachea.

The patient may be aware of the growth for many years without being inconvenienced by it. The first symptom is generally an uncomfortable feeling at the base of the tongue, a fulness in the throat, accompanied by a frequent desire to swallow. The voice then begins to change. It may be simply thick or nasal in quality, or it may entirely lose its resonance and be muffled and dead. Deglutition is often seriously inter-



ferred with, the patient finding it quite painful to swallow. There may be increased salivation, and fits of coughing due to irritation of the salivary glands and epiglottis. The respiration is troubled only in the cases of the largest tumors, or where the situation is low down enough so that the tumor presses the epiglottis over the rima glottidis, and this may be marked enough to cause death by suffocation. (Hickman.) The one symptom characteristic of lingual goitre, and upon which great stress should be laid, is the occurrence of profuse hæmorrhages. These occur at any time and without any apparent cause. They are unaccompanied by coughing, vomiting, or pain, and the patient is simply aware that her mouth is filled with fluid, which on expectoration proves to be blood. These hæmorrhages are due to the rupture of one of the many vessels covering the mucous membrane of the growth. (Plate V.) The mucous membrane is very thin, and is continually being torn by hits of food passing into the œsophagus or by constant rubbing against the epiglottis and posterior wall of the pharynx.

Examination of the mouth may result in nothing being seen, and, even when the tongue is drawn out as far as possible, the growth may not be visible, and its presence can only be determined by the use of the laryngoscope. By this means the general characteristics of the growth may be distinctly made out, and then with the finger its outline, consistency, and the lack of pain on pressure may be further ascertained. In only one case (Bernays) has there been any swelling beneath the jaw; but if there exists a large tumor, it may be felt upon deep palpation just below the inferior maxilla. It is especially important to discover, if possible, by palpation the presence or absence of the normal thyroid, in order to avoid the possibility of myxœdema following operation.

*Diagnosis.*—The diagnosis of lingual goitre is not always easy unless we have present the typical chain of symptoms. If the patient, especially if a woman, complains of a lump in her throat that has existed there for several years with no incon-

venience, that it has lately begun to grow, causing a change in her voice, trouble in breathing and deglutition, and especially if she complains of frequent hæmorrhages unaccompanied by cough or vomiting, and if, upon examination, a round, elastic tumor with a deeply injected mucous membrane is found at the base of the tongue, we are led at once to think of lingual goitre. Oftentimes the presence of hæmorrhages from the mouth is the only symptom; and if this is the case, we must rule out diseases of the lungs and stomach by physical examination and exclusion. The former can be ruled out by the absence of cough and the latter by absence of vomiting.

Given, then, a tumor at the base of the tongue, the main point in differential diagnosis is as to whether it is benign or malignant, in order that an operation exceeding the requirements of the case be not performed. The slow growth of the tumor, the long latent period, and the sudden development, absence of pain, and infiltration of the surrounding tissues, absence of enlargement of the cervical glands and the general good condition of the patient, all point towards a benign growth. Furthermore,

SARCOMA grows to a considerable size rapidly, is painful, and can only be confounded with lingual goitre in the beginning, when it is simply an indurated nodule.

CARCINOMA is not, as a rule, seen until late in life, is almost always ulcerated, is painful, and produces a very fetid secretion.

Granted, then, that we have a benign growth, what is its nature?

LIPOMA is quite soft, presenting more the appearance of a cyst than a goitre. Its golden yellow color can be seen shining through the mucous membrane covering, which is usually quite loose. It is, moreover, quite rarely to be found at the base of the tongue, its more common situation being in the middle or tip of this organ.

ANGIOMA is quite common at the base of the tongue. It may be covered with tortuous vessels and give rise to hæmor-

rhages, but its color is violet or bluish black, and is quite easily reduced upon pressure, immediately filling again.

FIBROMA, pure or mixed with fatty, bony, or cartilaginous elements, may be found in the tongue; but it tends to become pediculated quite quickly, and presents the appearance of a polypoid growth.

SYPHILITIC GUMMA grows in a different manner. It tends to ulcerate quickly, is often multiple, is not sharply defined; its mucous membrane covering is not deeply injected, and it is accompanied by other manifestations of syphilis.

HYPERTROPHY OF THE LINGUAL TONSILS is not very frequent; it is a superficial swelling only, and consists of whitish, yellow, hard concretions, which distend the crypts of the lymph follicles and project from the surface of the tongue.

CYSTS may occupy the same position as goitre at the base of the tongue, but, as a general rule, they are softer and more fluctuating. If the goitre has undergone cystic degeneration, the differentiation is more difficult. The color of a cyst differs, being yellow or brownish; its surface is not so markedly covered with vessels, while the membrane covering itself is thinner and more transparent. Dermoid cysts may greatly resemble goitre, but their growth is more rapid; there is no latent period; their color is yellow; they lack vascularity, and pit upon pressure.

*Prognosis and Treatment.*—The prognosis of lingual goitre is favorable. There have been no postoperative deaths, and in all cases that have come to operation the cure has been permanent. Medicinal attempts to cure the disease have been of little avail. Iodide seems to have a slight effect in reducing the growth, but its action is slow and rather ineffectual. Counter-irritation with iodine has been tried, and caustics and electrolysis have been used, but none of these methods have proved satisfactory, especially as in most cases the patient does not apply to a physician for relief until the symptoms are so grave that a quick removal of the growth is imperative.

Simple puncture or puncture followed by injections of

chloride of zinc or tincture of iodine are not to be recommended. Puncture is, in all cases of goitre, followed by profuse bleeding, and sometimes by inflammation and a sudden increase in the size of the growth. Moreover, the only thing to be learned by puncture is as to whether or not the tumor contains fluid. In the first case, we transform the growth into a loose pouch, which is harder to enucleate than if it were full; and in the second we accomplish nothing, and moreover expose the patient to the danger of infection.

The only rational method of treatment then is removal. The two principal means for accomplishing this have been by the use of the galvanocautery loop (Butlin, Baber, Seldowitsch, Holmes, Watson) and by incision with enucleation (Butlin, Warren, McIlraith, Lympius, Kraske, Reintjes, Gaudier, Lucke, Bernays, Schadle, Winslow, Galish, Wolf, Vallas, Mixer).

The use of the galvanocautery loop has, on the whole, been rather unsatisfactory. In all the cases in which it has been used, parts of the tumor have been left, causing a slight return of the growth. This return has not been excessive, but it is to be regretted, unless rendered necessary by the absence of a true thyroid.

There remains then total enucleation. This is a comparatively easy operation, as the tumor is well defined and not adherent to the neighboring tissues. The base of the tongue may be reached in two ways, either through the buccal cavity or through an incision in the suprahyoid region, which may be simple or include the hyoid bone or inferior maxilla.

Enucleation through the mouth is the method chosen by Butlin, Warren, McIlraith, Lympius, Kraske, Reintjes, Gaudier, and Mixer. This operation is as follows. After etherization the jaws are kept open as far as possible by means of a gag; a silk ligature is then passed through the tip of the tongue for traction, and a second ligature passed through the muscles of the base of the tongue under and below the mass of the tumor. This second ligature renders traction on the tongue

quite easy, and after enucleation is of great assistance in controlling the hæmorrhage and in approximating the edges of the wound. The tongue is then drawn forward as far as possible until the tumor appears between the incisors, a longitudinal incision is made in the growth, and the tumor enucleated. The redundant mucous membrane on either side of the wound is then trimmed off and the edges brought together with catgut sutures. In some cases tracheotomy has been first performed, but this procedure does not seem to be indicated. The patient may be placed in Rose's position with the head extended over the edge of the table, and in this way the blood may be kept from running down into the trachea. It is well, also, to keep the pharynx as clean as possible by sponging it at intervals with some antiseptic solution.

The simple suprahyoid method has been used by Lucke, Bernays, Schadle, and Winslow. An incision is made from the symphysis menti to the hyoid bone in the median line, dividing all the structures down to the tumor, which can then be enucleated. The opening made in this manner is rather small; and if the tumor is at all large or situated rather high on the dorsum of the tongue, enucleation is rendered quite difficult. To overcome this trouble, Wolf first performed tracheotomy, made a median incision above the hyoid bone, ligatured the lingual arteries, divided the inferior maxilla, and split the tongue itself until he reached the tumor. This procedure gave a large opening in which to work, but the operation is too serious, too long, and too mutilating; it is, moreover, unnecessary, as the method employed by Galish, Vallas, and Gaudier accomplishes the same result and is much simpler. An incision is made in the median line from the chin to the superior angle of the thyroid cartilage. The hyoid bone is then denuded and divided in halves, and the incision carried through the mylohyoid and geniohyoid muscles to the tumor. After enucleation, the hyoid bone is sutured with silver wire and the muscles and skin with catgut, horsehair, or whatever is desired. The opening made in this manner is large and the wound heals easily and quickly.

The indications for each of these operations depend upon the size and situation of the tumor. The buccal method is easily the best when practicable. It is but a short operation, is simple, and leaves no scar, which is a great advantage when we consider that most of the patients are women. This method can be used when the patient's mouth is large, the tongue long and slender, and the tumor of not very great size and situated rather high on the base of the tongue. If the tumor is large and low, the patient's tongue thick and short, and the mouth small, then, if possible, it is best to use the simple suprahyoid incision. If the opening thus made is not large enough, then the hyoid bone may be divided.

#### CONCLUSIONS.

1. Lingual goitre is a tumor at the base of the tongue, arising from an accessory thyroid gland which may be found in the course of the development of the thyroglossal duct.

2. It has all the characteristics of ordinary goitre.

3. It occurs almost exclusively in women between the ages of fifteen and forty. It grows slowly, and may exist for years without causing any annoyance until some unknown cause stimulates its growth and produces symptoms. These are functional and not constitutional, and consist of trouble in swallowing, breathing, and speaking, accompanied by frequent hæmorrhages.

4. The tumor is round or ovoid, elastic, and covered with a very vascular mucous membrane, and is almost never ulcerated.

5. Dermoid cyst offers the only difficulty in differential diagnosis, but this is generally yellow, grows rapidly, pits on pressure, and has not the vascularity of goitre.

6. Operation is the only radical cure. There are two ways of reaching the tumor, namely, through the mouth and through an incision in the suprahyoid region, the former being the best.

7. The prognosis is good.

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